HYDAC INTERNATIONAL

Oil condition sensor
HYDACLAB® HLB 1400

Sequential analogue and switching output

Oil condition | **4 measured variables**

Features

- Online condition monitoring of oils
- Oil condition indicated by LEDs
- Use is possible in industrial and mobile applications
- Analogue output sequence for:
  - Saturation level
  - Temperature
  - Conductivity and relative change in the electrical conductivity
  - Dielectric constant and relative change in the dielectric constant
- Simple cartridge mounting

Description

The HYDACLAB® HLB 1400 with IO-Link interface is a multi functional sensor for online monitoring of the condition of standard oils and bio degradable oils in industrial and mobile applications.
The user is informed about changes in the fluid in real time and can implement measures against improper operating conditions without delay.

Assertions can be made about the condition of an oil, e.g. time deterioration or mixing with other fluids, on the basis of the measured values for the relative change in dielectric constant, the electric conductivity and its change, the saturation level and the temperature.

At the HYDACLAB®s electric output, the measured values are available as sequential analogue and switching signals (e.g. warning, alarm). The measured values can be visualised and configured on various HYDAC display, measurement and service instruments.

Fields of application

Applications are mainly found in condition monitoring.
The HLB 1400 enables oils to be monitored continuously, accurately, permanently and online.

Technical data

Input data	
Saturation level	0.0 .. 100.0 %
Temperature	-25 .. 100 °C
Dielectric constant	1 .. 10
Change in the dielectric constant	-30 .. 30 %
Electrical conductivity	0 .. 100 nS/m
Change of electrical conductivity	-100 .. 200 %
Operating pressure	< 50 bar
Pressure resistance	< 600 bar
Flow velocity	< 5 m/s
Mechanical connection	G 3/4 A ISO 1179-2
Tightening torque, recommended	30 Nm
Parts in contact with fluid	Stainless steel Ceramic / glass with metallic coating Seal FKM
Output variables	
Output signal	4 20 mA / 0 .. 10 V
Output variable saturation level	**0.0 .. 100.0 %**
Calibration accuracy	≤ ± 2 % FS max.
Accuracy[1)]	≤ ± 3 % FS typ.
Output variable temperature	**-25 .. 100 °C**
Accuracy	≤ ± 3 % FS max.
Output variable dielectric constant (raw range) does not apply for mod. 000 and Mod. 001	**1 .. 10**
Accuracy	≤ ± 5 % FS max.
Output variable dielectric constant (temperature compensated)	**1 .. 10**
Accuracy	≤ ± 5 % FS max.
Output variable change of dielectric constant	**± 30 % of IV**
Accuracy	See below[2)]
Output variable electric conductivity (raw range) does not apply for mod. 000 and Mod. 001	**0 .. 100 nS/m / 0 .. 10 nS/m selectable**
Accuracy	≤ ± 5 % FS max.
Output variable electric conductivity (temperature compensated) does not apply for mod. 001	**0 .. 100 nS/m / 0 .. 10 nS/m selectable**
Accuracy	≤ ± 5 % FS max.
Output variable change of electrical conductivity does not apply for mod. 001	**-100 .. 200 % of IV**
Accuracy	See below [2)]
Switching output (pre-set)	
Signal 1 (NC)	PNP switching output 250 mA max. switching level ≥ U_B – 4 V
Pre-set alarm SP1 humidity	≥ 85 %
Pre-set alarm SP1 temperature	≥ 80 %
Pre-set alarm SP1 rel. change in the dielectric constant	± 15 %
Pre-set alarm SP1 rel. change in conductivity does not apply for mod. 001	± 15 %
Environmental conditions / Approvals / Tests	
Nominal temperature range	+20 .. +80 °C
Storage temperature range / Fluid temperature range	-30 .. +100 °C
Fluid compatibility	Suitable for hydraulic and lubrication oils
EMC	EN 61000-6-1/ 2/ 3/ 4
CE / UKCA conformity	Provided
cULus approval [3)]	Provided
Viscosity range	1 .. 5000 cSt
Shock resistance acc. to DIN EN 60068-2-27	50 g / 11 ms / half sine
Vibration resistance acc. to DIN EN 60068-2-6 at 5 .. 2000 Hz	10 g / sine
Protection type acc. to DIN EN 60529[4)]	IP 67

Other data	
Supply voltage U_B	10 .. 36 V DC
Supply voltage when applied acc. to UL specifications	-limited energy- acc. to 9.3 UL 61010,Class2; UL 1310/1585; LPS UL 60950
Residual ripple of supply voltage	≤ 5 %
Current consumption	Max. 100 mA without outputs
Housing	Stainless steel
Weight	~ 215 g

Note: Reverse polarity protection, short circuit protection provided.
FS (**F**ull **S**cale) = relative to complete measuring range
SV (**S**tart**V**alue)

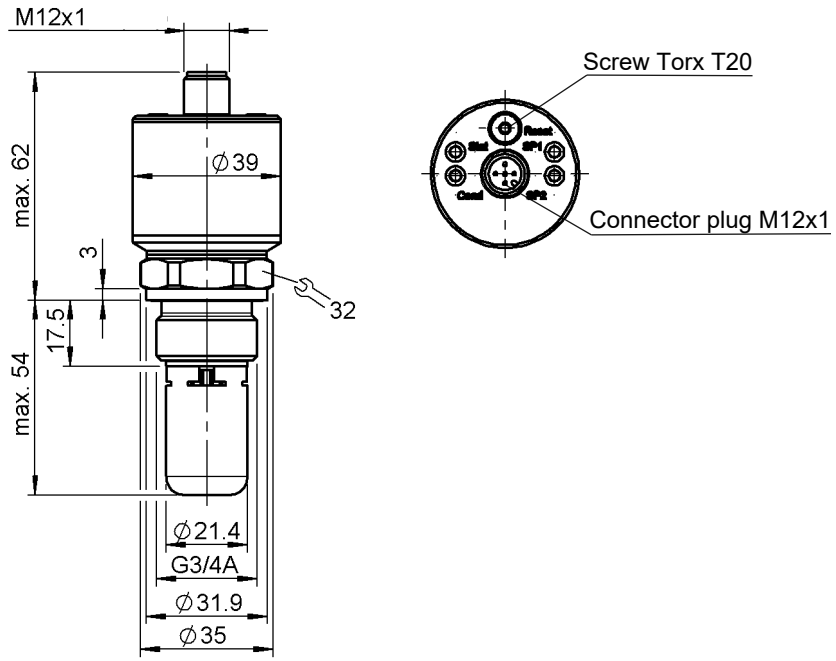
[1] The maximum accuracy achievable when measuring relative humidity is heavily dependent on the type of fluid or additive used. More precise information on this is available on request.

[2] The accuracies when defining the change of dielectric constant and the electrical conductivity depend on the application, the oil type and the auto-calibration of the sensor. Detailed information is available on request.

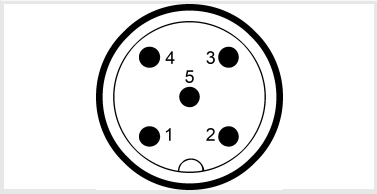
[3] Environmental conditions acc. to 1.4.2 UL 61010-1; C22.2 no. 61010-1

[4] With mounted mating connector in corresponding protection type

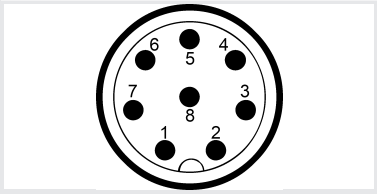
Dimensions



Pin connections

M12x1, 5 pole	Pin	Output: 1C000	Output: 00S12
	1	$+U_B$	$+U_B$
	2	SP1/AA1	RS485B
	3	GND	GND
	4	SP2/AA2	RS485A
	5	HSI	HSI

HSI = **H**YDAC **S**ensor **I**nterface (HYDAC's own communication interface)
SP = Switching point
AA = Analogue output (sequence)

M12 x 1, 8 pole	Pin	Output: 1CS12
	1	$+U_B$
	2	SP1/AA1
	3	GND
	4	PE
	5	HSI
	6	RS485A
	7	RS485B
	8	SP2/AA2

HSI = **H**YDAC **S**ensor **I**nterface (HYDAC's own communication interface)
SP = Switching point
AA = Analogue output (sequence)

Display, read-out and configuration options

HMG 510
Portable double channel data recorder, especially designed for the display of measured values in combination with HSI and condition monitoring sensors
Order no.: 909889

HMG 2500 / HMG 4000
Portable data recorders with full colour graphics for displaying, recording and processing measured values as well as for the configuration of HSI and condition monitoring sensors

CMU 1000
Electronic evaluation unit for online measured value monitoring as well as for the configuration of HSI and condition monitoring sensors
Order no.: 920718

CSI-B-2
Interface module, enables the configuration of HSI and condition monitoring sensors using HYDAC PC software CMWIN
Order no.: 920134

Information on other read-out options can be found on our website at www.hydac.com or please contact your HYDAC representative.

Model code

HLB 1 4 J X - XXXXX - 000

Measured variables

4 = 4 measured variables
- Saturation (rel. humidity)
- Temperature
- Electrical conductivity (not suited for mod. 001)
- Dielectric constant (DC)

Mechanical connection

G3/4 A ISO 1179-2

Electrical connection

8 = Plug connector M12x1, 5 pole (without mating connector)
8 = Plug connector M12x1, 8 pole (without mating connector)

Signal technology

5 pole:

1C000 = 1 switching outputs/ analogue output
00S12 = RS485

8 pole:

1CS12 = Switching output / analogue output / RS485

Modification number

000 = Standard
001 = HLB 14J8-1C000-001 serves as a pure replacement for HLB 1300.
The analogue output 2 of this device is pre-set in a way that no conductivity values will be output.
100 = Standard with 1 decimal saturation degree as well as the raw values for conductivity and dielectric constant

Accessories:
Appropriate accessories, such as mating connectors, can be found in the Accessories brochure.

Note

The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.

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